The Association of Cognitive Function Assessments among Older Women

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Abstract

Background: Alzheimer's disease (AD) is a loss of mental capabilities due to the slow degeneration of the brain and is the leading cause of dementia. Dementia is caused by the damage of neurons in the brain from diseases or injury, not only affecting mental abilities but also affecting daily activities.[1] Every 65 seconds someone is diagnosed with AD and currently there is no known cure.[1] Traditional cognitive testing is time consuming, expensive, can misdiagnose, and there is a lack of neuropsychologist. There is a need for a cognitive test that can provide an accurate, cheaper, and quicker result in order to help slow the degeneration. **Purpose:** The purpose of this study was to compare the correlation of the of common cognition tests such as Montreal Cognitive Assessment (MoCA) and NIH toolbox cognitive battery (NIHTB-CB) to Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) **Methodology:** The participants of this study were women over 50 years. Upon the first visit the participants were sent an informed consent to complete before beginning the study. Once they arrived to the lab, they completed seven cognitive assessments. The order was as follows: MoCA, NIHTB-CB, and RBANS. A Pearson's correlation was performed to determine associations between the independent and dependent variables. **Results:** Twenty-eight women (60.4 + 5.1 years) participated in the present investigation. Statistically significant correlations were found between MoCA and RBANS (r = .39, p = .04), and list sorting and RBANS (r = .47, p = .02). **Discussion:** The results showed positive correlations between the cognitive tests. These results suggest that either MoCA or the List Sorting assessment of the NITB-CB could be used rather than the cumbersome RBANS assessment to determine changes in cognitive performance among older women.

Purpose

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Introduction

- Alzheimer's disease (AD) is the leading cause of dementia.[1]
- Every 65 seconds someone is diagnosed with dementia.[1]
- Currently, it is estimated that around 5.8 million people living in the US have been diagnosed with AD.
- AD is the sixth leading cause of death.[1]
- Currently the only way of determining AD is by taking an autopsy.
- The average onset is 71 years old; however , it has been made known that it actually begins 20 years before it is recognizable.[2]
- Young onset dementia is affecting cognition and the behaviors of individuals under the age of 65.[2]
- A valid assessment that can detect cognitive decline quickly and inexpensively can help decrease the long term financial burden and lead to practitioners providing interventions early enough to discontinue the rate of mild cognitive decline.

Methods

- The participants of this study are all women over the age of 50.
- Upon the first visit the participants were sent an informed consent to complete before beginning the study.
- Once they come in they are to complete a total of 7 different tests in a specific order. These include both cognitive and biometric assessments. The order is as follows: MoCA, VPC, NIHTB-CB, DXA, hand grip, Dual task, and lastly RBANS.
- **Montreal Cognitive Assessment.** MoCA is a 10 minute test designed to screen for mild cognitive dysfunction.[4]
- **VPC-5 Assessment.** The VPC-5 assessment was performed using a laptop with a built in camera.
- **NIHTB-CB.** The NIHTB-CB assessment consist of four test and was given on an iPad (version 11.4, Apple Inc., Cupertino, CA). The multiple test measured different functions of the brain such as working and episodic memory, executive function, and processing speed.
- **Hand Grip.** For this test the participant held onto the hand held dynamometer down by their side and wrapped their fingers around the handle at a 90 degree angle.
- **Dual Task.** Within the dual task assessment there were 4 trials, repeated twice. In each of these trials, participants were asked to walk 10 meters which was marked out on the floor. The 4 different test were used as a visual to compare their baseline times for normal and fast pace walking to their times when dual task were included.
- **RBANS (Form A).** The RBANS assessment was performed using an iPad (version 11.4, Apple Inc., Cupertino, CA) and a pencil and paper. This assessment had 12 cognitive sub-test which tested for immediate memory, delayed memory, attention, language, and visuospatial abilities, all of which made up the five Index scores[3]
- **- Biometric Assessments** Subject's height and weight were measured before entering the dual-energy X-ray absorptiometry (DXA, General Electric, Fairfield, CT). Both height and weight were measured on a balance beam scale (Sunbeam Products, Inc., McCook, IL).

How common cognition tests compare to RBANS

	Mean	Std. Deviation	N
Age	60.4	5.1	28
Weight	77.22	18.53	27
Height	144.86	19.27	27
MoCA	27.69	2.16	29
RBANS Form A	111.63	11.01	30
Flanker	35.04	20.71	24
List Sorting	67.50	26.50	24

Table 1. Descriptive Statistics

		MoCA	RBANS_Test 1 (A)	Flanker
MoCA	Pearson Correlation	1	.39	-.03
	Sig. (2-tailed)		.04	.88
RBANS Form A	Pearson Correlation	.39	1	-.07
	Sig. (2-tailed)	.04		.76
Flanker	Pearson Correlation	-.03	-.07	1
	Sig. (2-tailed)	.86	.76	
List Sorting	Pearson Correlation	.36	.47	.03
	Sig. (2-tailed)	.09	.02	.89

Table 2: A Pearson's correlation was performed to determine associations between the independent and dependent variables.

Results

- Twenty-eight women (60.4 + 5.1 years) participated in the present investigation.
- Statistically significant correlations were found between MoCA and RBANS (r = .39, p = .04), and list sorting and RBANS (r = .47, p = .02).
- Results of MoCA and RBANS were found to have a positive correlation.
- Results of List sorting and RBANS also have a positive correlation.
- Positive correlation in these cases meant that as one variable increased the other increased as well.
- List sorting has a higher r value compared to MoCA and therefore relates more to RBANS.

Conclusion

These results suggest that either MoCA or the List Sorting assessment of the NITB-CB could be used rather than the cumbersome RBANS assessment to determine changes in cognitive performance among older women.

References

1. 2016 Alzheimers disease facts and figures. (2016). *Alzheimers & Dementia*, *12*(4), 459–509. doi: 10.1016/j.jalz.2016.03.001
2. Draper, B., & Withall, A. (2016). Young onset dementia. *Internal Medicine Journal*, *46*(7), 779–786. doi: 10.1111/imj.13099
3. Duff, K., Hobson, V. L., Beglinger, L. J., & Obryant, S. E. (2010). Diagnostic Accuracy of the RBANS in Mild Cognitive Impairment: Limitations on Assessing Milder Impairments. *Archives of Clinical Neuropsychology*, *25*(5), 429–441. doi: 10.1093/arclin/acq045
4. Nasreddine, Z. S., Phillips, N. A., Bã©Dirian, V. R., Charbonneau, S., Whitehead, V., Collin, I., … Chertkow, H. (2005). The Montreal Cognitive Assessment, MoCA: A Brief Screening Tool For Mild Cognitive Impairment. *Journal of the American Geriatrics Society*, *53*(4), 695–699. doi: 10.1111/j.1532-5415.2005.53221.x